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## NEW SPECIES AND RECORDS OF COLOMBIAN, ECUADORIAN AND VENEZUELAN ANACRONEURIA (PLECOPTERA: PERLIDAE), WITH A REVIEW OF THE ANACRONEURIA AYMARA STARK & SIVEC COMPLEX

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### ABSTRACT

The *Anacroneuria aymara* Stark & Sivec species complex is reviewed. A new species from Venezuela, *A. barinas*, is recognized and described from two male specimens, and a key to male members of the complex is presented. An additional new species, *A. yuko* is recognized from Sierranía de Perijá, Colombia, new Colombian records are given for *A. angusticollis* (Enderlein), *A. cipriano* Zúñiga & Rojas, *A. crusa* Stark, *A. farallonesis* Rojas & Baena, *A. inza* Zúñiga & Stark, *A. mindo* Zúñiga & Vásconez, and *A. paleta* Stark, and additional records are given for *A. bari* Stark, *A. bifasciata* (Pictet), *A. paleta* Stark, and *A. paria* Stark from Venezuela. The female of *Anacroneuria carchi* Stark is described from Ecuador, and an unassociated female from Venezuela is described under informal designation.

**Keywords:** Plecoptera, Perlidae, *Anacroneuria*, Colombia, Ecuador, Venezuela, new species, new records

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### INTRODUCTION

The *Anacroneuria aymara* Stark & Sivec, 1998, species complex was recognized by Maldonado et al. (2002), Zúñiga & Stark (2002) and Zúñiga et al. (2006), but remains poorly defined. Known members of the group are small to medium sized stoneflies with male forewing lengths in the 9-12 mm range. The aedeagal features of male specimens are distinctive in having a simple, slender apex, often terminating in a truncate, rounded or slightly notched apical margin, a small pair of membranous

ventral lobes, and a dorsal keel of two distinct, often curved ridge lines. The hooks are usually subchelate and the hammer is typically thimble shaped (Maldonado et al. 2002; Stark 2001; Stark & Sivec 1998; Stark et al. 1999; Stark et al. 2012; Zúñiga & Stark 2002). Associated females, except for the putative female of *A. cotacachi* Stark, 2001, have 4-lobed subgenital plates.

Species assigned to the *A. aymara* group have a Neotropical distribution, and are primarily found in the Andean region (Table 1) at an elevational range

**Table 1.** Checklist of species assigned to the *Anacroneuria aymara* complex.

Species	Authors	References	Distribution
<i>A.aymara</i>	Stark & Sivec	Stark & Sivec, 1998 Zúñiga et al., 2006	Peru: Cuzco, Madre de Dios
<i>A.apuela</i>	Stark & Gill in Stark et al., 2012	Stark et al., 2012	Ecuador: Imbabura
<i>A.barinas</i>	sp. n.		Venezuela: Barinas
<i>A.chachis</i>	Stark & Vásconez in Zúñiga et al., 2006	Zúñiga et al., 2006	Ecuador: Pastaza, Pichincha
<i>A.chaima</i>	Stark	Stark, 1999	Venezuela: Sucre
<i>A.cotacachi</i>	Stark	Stark, 2001	Ecuador: Pichincha
<i>A.farallonenensis</i>	Rojas & Baena	Rojas & Baena, 1993, Zúñiga et al., 2007, Castillo et al., 2013	Colombia: Valle del Cauca, Risaralda, Nariño
<i>A.portilla</i>	Stark & Rojas in Stark et al., 1999	Stark et al., 1999 Stark, 2001 Zúñiga & Stark, 2002 Zúñiga et al., 2006, Castillo et al., 2013	Colombia: Cauca, Nariño, Risaralda, Valle del Cauca Ecuador: Loja, Napo, Pichincha
<i>A.ricki</i>	Zúñiga & Stark in Zúñiga et al., 2006	Zúñiga & Stark, 2002, Zúñiga et al., 2006	Colombia: Valle del Cauca Ecuador: Esmeraldas
<i>A.segnini</i>	Stark & Maldonado in Maldonado et al., 2002	Maldonado et al., 2002	Venezuela: Mérida
<i>A.tatama</i>	Stark & Cardona in Zúñiga et al., 2007	Zúñiga et al., 2007 Castillo et al., 2013	Colombia: Nariño, Risaralda
<i>A.toni</i>	Zúñiga & Stark	Zúñiga & Stark, 2002	Colombia: Cauca

of 40-2600 m a.s.l., but frequently between 1100-2000 m a.s.l. Previous records for the complex include species from Colombia (Rojas & Baena 1993; Stark et al. 1999; Zúñiga & Stark 2002; Zúñiga et al. 2006), Ecuador (Zúñiga et al. 2006; Stark et al. 2012), Peru (Stark & Sivec 1998) and Venezuela (Maldonado et al. 2002). The material examined in this study includes two males of an apparent new species in the *A.aymara* complex, and a single male of an apparent new species from "Socorpa Mission", Sierra de

Perija, Colombia; the second species is not included in the *A.aymara* complex. Records of eleven additional *Anacroneuria* species from scattered localities include the first known Colombian specimens of *A.cruza* Stark, 1995, and *A.mindo* Zúñiga & Vásconez, 2006 (in Zúñiga et al. 2006), and the first female specimen of *A.carchi* Stark, 2001.

## MATERIALS AND METHODS

The abdomen of male specimens was clipped near

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midlength, placed in 10% KOH and brought to a boil. Specimens were removed from KOH, placed in a dish of distilled water and the extraneous tissue removed, leaving the aedeagus intact. This was removed by pulling the aedeagus forward with fine tipped forceps, and through the opening where the abdomen had been clipped. The aedeagus, 9<sup>th</sup> abdominal sternum, head and pronotum and female subgenital plate of selected specimens were drawn using Wild M5A and Olympus SZH10 stereomicroscopes equipped with drawing tubes. Specimens were obtained from the Monte L. Bean Life Science Museum, Brigham Young University, and additional specimens, formerly included in the S.G. Jewett, Jr. collection, but collected by California Academy of Sciences personnel and forwarded to us for study by R.W. Baumann, were also available. The holotype of *A. barinas* is deposited with the United States National Museum of Natural History, Washington, D.C. (USNM) through the courtesy of the Monte L. Bean Life Science Museum, and other specimens are deposited with the California Academy of Sciences, San Francisco, California (CAS), the Monte L. Bean Life Science Museum, Provo, Utah (BYUC). Venezuelan specimens collected by R. Holzenthal, C. Cressa and colleagues are deposited in the B.P. Stark collection, Mississippi College, Clinton, Mississippi (BPSC).

## RESULTS AND DISCUSSION

### The *Anacroneuria aymara* Stark & Sivec Complex

#### *Anacroneuria aymara* Stark & Sivec

*Anacroneuria aymara* Stark & Sivec 1998:7. Holotype ♂ (United States National Museum), Erika, Manu, Madre de Dios, Peru.

*Anacroneuria aymara*: Stark, 2001:7. Ecuador record, not Stark & Sivec (see *A. chachis* Stark & Vásconez in Zúñiga et al., 2006).

**Comments.** No additional records are available for this species, but the tentative identification of an Ecuadorian specimen as *A. aymara* by Stark (2001) has subsequently been refuted in Zúñiga et al. (2006) when the specimen was placed as a paratype of *A. chachis*. The revised distribution is shown in Fig. 20.

#### *Anacroneuria farallonensis* Rojas & Baena

*Anacroneuria farallonensis* Rojas & Baena 1993:25. Holotype ♂ (Museo de Entomología de la Universidad del Valle). Peñas Blancas, Rio Cali, Valle del Cauca Department, Colombia.

*Anacroneuria farallonensis*: Zúñiga & Stark, 2002:216. Redescription and placement in *A. aymara* complex.

**Material examined. Colombia:** Valle del Cauca Department, 6 miles W Cali, 20 March 1955, E.I. Schlinger, E.S. Ross, 1♂ (CAS).

**Comments.** The known collections of this species include the holotype male, and four male and four female specimens from the type locality in a protected area (Parque Nacional Farallones de Cali) with extensive riparian vegetation and clear, unpolluted water in Valle del Cauca Department, Colombia (Zúñiga & Stark 2002). Three additional males and one female specimen, collected in Risaralda and Nariño Departments in the Central Andes, seem to confirm the distribution of this species in the highlands between 2000 and 2600 m a.s.l. (Castillo et al. 2013; Zúñiga et al. 2007). The current known distribution is shown in Fig. 20.

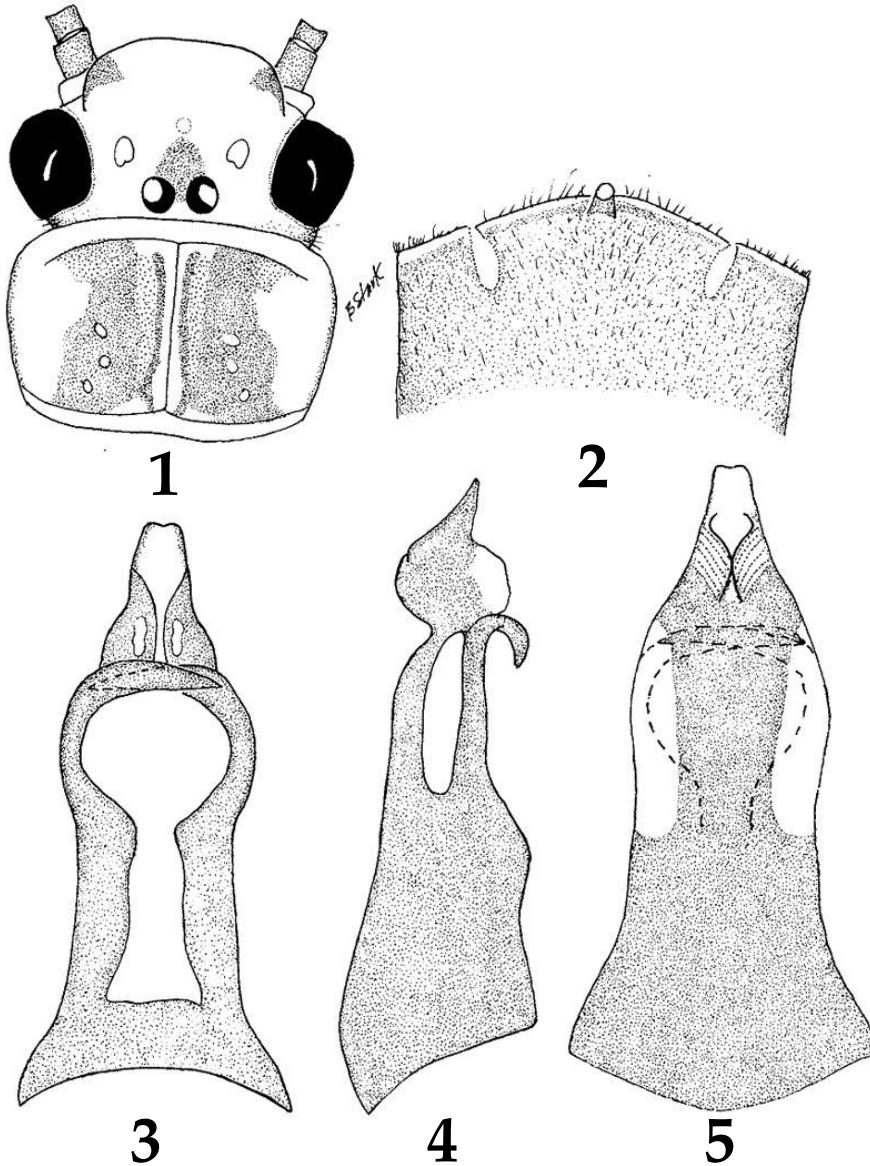
#### *Anacroneuria barinas* sp. n.

(Figs. 1-5, 21)

**Material examined.** Holotype ♂, Venezuela, Barinas State, 15 km W Altamira de Caceras, 1000 m, 30 December 1985, P. Keverik, R. Jones (USNM). Paratype: Venezuela: Barinas State, 10 km southeast of Miri, 8 February 1970, 150 m, S.L. Wood, 1♂ (BYUC).

**Adult habitus.** General color brown with yellow to yellow-brown markings. Lappets dark brown, frons yellow-brown with slightly darker, diffuse-brown area forward of ocelli (Fig. 1). Pronotum brown over much of disc, but pale laterally and along median suture. Wings pale amber with darker veins; C and Sc pale amber. Dorsum of legs brown, but pale along ventral margins.

**Male.** Forewing length 9-10 mm. Hammer thimble shaped, height greater than apical diameter (Fig. 2). Aedeagal apex truncate, slightly emarginate, simple, but bearing a ventral pair of small membranous lobes (Fig. 3), and a distinctive pair of dorsal keel lines



Figs. 1-5. *Anacroneuria barinas* male. 1. Head and pronotum. 2. Sternum 9 with hammer. 3. Aedeagus, ventral. 4. Aedeagus, lateral. 5. Aedeagus, dorsal.

which meet at midlength and curve outward nearer apex, approximating a Y-shape (Fig. 5). Dorsolateral margins along keel lines slant steeply to ventrolateral base, and apices of keel lines extend to midlength of apex in lateral aspect (Fig. 4) and form a slight marginal incision in subapical profile. Hooks subchelate (Fig. 3); apex of right hook of holotype (in

ventral aspect) broken.

**Female.** Unknown.

**Larva.** Unknown.

**Etymology.** The species name, used as a noun in apposition, is based on the Venezuelan state in which the holotype was collected.

**Diagnosis.** The dorsal keel of the new species is

almost identical to that of *A. toni* Zúñiga & Stark 2002, but the aedeagus of that species has a slight subapical constriction causing the truncate apex to be wider than the subapical area. In *A. barinas*, the lateral subapical aedeagal margins narrow to a slightly emarginate apex (Figs. 3-5).

**Comments.** One of us (BPS) first studied the specimen now designated as holotype from the Monte L. Bean Life Science Museum, Brigham Young University, in 1998, and labelled it “*Anacroneuria* n. sp.” Recently, it was returned for additional study through the courtesy of R.W. Baumann, and a second specimen, collected by S.L. Wood from a nearby site was also included. Both sites are located in the Cordillera de Mérida, the highest mountain range in the Venezuelan Andes. The species is a member of the *A. aymara* complex (Maldonado et al. 2002; Zúñiga & Stark 2002; Zúñiga et al. 2006; Stark et al. 2012), which currently includes the species listed in Table 1. Distributions (by Department, Province or State) for these 12 species are shown in Figs. 20-23. The key below will assist in recognition of male specimens assigned to this complex.

### Key to Male Members of the *Anacroneuria aymara* Complex

1 Dorsal keel lines touch near midlength (Fig. 5)	.....	2
1' Dorsal keel lines completely separated throughout length (Fig. 5, Maldonado et al. 2002)	.....	4
2 Lateral margins of aedeagus convergent from shoulders to tip (Fig. 3)	.....	<i>barinas</i>
2' Lateral margins of aedeagus relatively straight from shoulders to tip (Fig. 17, Zúñiga & Stark 2002)	.....	3
3 Dorsal keel lines much more widely divergent anteriorly than posteriorly; hooks subchelate; lateral margins of aedeagus slightly constricted near apex (Figs. 17-19 in Zúñiga & Stark 2002)	.....	<i>toni</i>
3' Dorsal keel lines diverge to a similar degree anteriorly and posteriorly; hooks slender; lateral margins of aedeagus not constricted subapically (Figs. 22-24, Zúñiga & Stark 2002)	.....	<i>ricki</i>
4 Lateral margins of aedeagal apex more or less parallel at least near tip (Fig. 3, Stark et al. 2012)	.....	5
4' Lateral margins of aedeagal apex convergent from shoulders to tip (Fig. 12, Stark & Sivec 1998)	.....	8
5 Aedeagal apex notched; keel lines curved abruptly laterad near apex (Figs. 3-5, Stark et al. 2012)	.....	<i>apuela</i>
5' Aedeagal apex truncate or rounded; keel lines not curved abruptly laterad near apex (Fig. 100, Stark et al. 1999)	.....	6
6 Lateral margins of aedeagal apex parallel to slightly convergent; lateral margins relatively straight (Figs. 98-100, Stark et al. 1999)	.....	<i>portilla</i>
6' Lateral margins of aedeagal apex wider subapically than at the tip; lateral margins undulant from beyond hooks (Fig. 31, Zúñiga & Stark 2002)	.....	7
7 Aedeagal tip wider than subapex; keel short, consisting of two lines (Fig. 29-31, Zúñiga & Stark 2002)	.....	<i>farallonensis</i>
7' Aedeagal tip narrower than subapex; keel lines relatively long, but consisting of two obscure beaded lines (Figs. 24-26, Zúñiga et al. 2007)	.....	<i>tatama</i>
8 Dorsal keel lines widely spaced and abruptly bent outward near midlength; lateral margins of aedeagal apex slightly convergent from shoulders to tip (Fig. 14, Stark & Sivec 1998)	.....	9
8' Dorsal keel lines almost straight, or curved slightly outward; lateral margins of aedeagal apex distinctly convergent from shoulders to tip (Fig. 14, Zúñiga et al. 2006)	.....	10
9 Aedeagal apex projecting beyond hooks in ventral aspect approximately triangular in outline, strongly convergent to tip (Fig. 14, Stark 1999)	.....	<i>chaima</i>
9' Aedeagal apex projecting beyond hooks in ventral aspect more gradually convergent with lateral margins almost parallel for part of length, and with broadly rounded apex (Figs. 12-14, Stark & Sivec 1998)	.....	<i>aymara</i>
10 Apex of aedeagus notched; keel lines narrowly separated (Fig. 14, Zúñiga et al. 2006)	.....	<i>chachis</i>

10' Apex of aedeagus truncate or rounded; keel lines more widely separated (Figs. 35–37, Stark 2001) ..... 11  
11 Hooks subchelate; pronotal dark pigment bands together about as wide as pale median band (Figs. 1, 3, Maldonado et al. 2002) ..... *segnini*  
11' Hooks slender; pronotal dark pigment bands together much narrower than pale median band (Figs. 33, 35, Stark 2001) ..... *cotacachi*

#### Additional Records and Descriptions of *Anacroneuria*

##### *Anacroneuria angusticollis* (Enderlein)

*Neoperla angusticollis* Enderlein 1909:409. Holotype ♂ (Polish Academy of Sciences, Warsaw), Rio Magdalena, Colombia.

*Anacroneuria unicolor* Klapálek 1922:94. Holotype ♂, Colombia, syn. Zwick (1973).

*Anacroneuria angusticollis*: Stark et al., 1999:17. Redescription

**Material examined. Colombia:** [Putumayo Department], Santa Rosa de Sucumbios, Kofan Indian Village, Rio San Miguel, 400 m, 26 August–9 September 1971, B. Malkin, 1♂ (CAS).

**Comments.** The holotype specimen, and the holotype for the synonym are both from Colombia, but this is the first new record of the species from Colombia since the original descriptions were published, and the first where the collection sites are clearly defined. Both holotypes were taken from the Rio Magdalena, however the precise locality along the approximate 1500 km of stream length is unknown. The “Kofan Indian Village” site for our specimen is located in the Amazon Natural Region. The San Miguel River is a tributary of the Putumayo River and together these streams form the southeastern border of Colombia with Ecuador and Peru.

##### *Anacroneuria bari* Stark

*Anacroneuria bari* Stark 1995:226. Holotype ♂ (United States National Museum), 45 km SW Machiques, El Tucuco, Zulia State, Venezuela.

**Material examined. Venezuela:** Lara State,

Quebrada Los Frailes, 8.3 km from San Pedro, 9°48.358'N, 70°05.297'W, 1892 m, 23 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 3♂ (pinned, BPSC).

**Comments.** This species is reported from Colombia, Ecuador and five states in Venezuela (Maldonado et al. 2002; Stark 1995; 1999, 2001; Zúñiga et al. 2007). These are the first records from Lara State in western Venezuela. This region has an abundance of xerophytic vegetation, but the mountainous regions have remnants of cloud forests. Streams in this area flow into the Caribbean or into the Orinoco River drainage basin. The Colombian specimens are from the Región Natural Andina in the Cordillera Occidental and the Cauca

##### *Anacroneuria bifasciata* (Pictet)

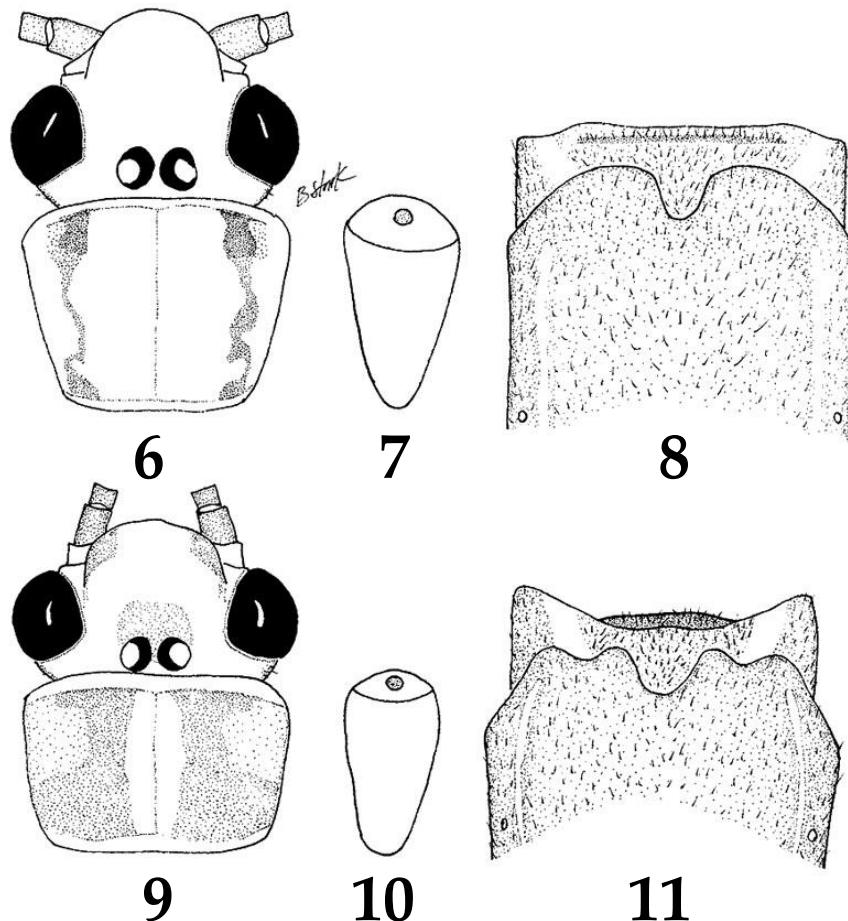
*Perla bifasciata* Pictet 1841:230. Holotype ♀ (Museum für Naturkunde Berlin), Colombia

*Anacroneuria bifasciata*: Zwick, 1972:1154.

*Anacroneuria bifasciata*: Stark, 1995:239.

**Material examined. Venezuela:** Falcón State, Quebrada El Charo, Cataratas, 10°46.771'N, 69°12.173'W, 425 m, 12 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 1♂, 1♀ (pinned, BPSC). Falcón State, Parque Nacional Cueva de la Quebrada del Toro, Quebrada del Toro, 10°49.581'N, 69°07.990'W, 530 m, 11 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 1♀ (pinned, BPSC). Lara State, Quebrada Los Frailes, 8.3 km from San Pedro, 09°48.358'N, 70°05.297'W, 1892 m, 23 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 1♀ (pinned, BPSC).

**Comments.** *Anacroneuria bifasciata* was previously reported from three states (Aragua, Carabobo, Lara) and the Distrito Federal of Venezuela, in addition to two sites in Colombia (Froehlich 2010). Only one of the Colombian sites is specifically known, and it lies within Antioquia Department in the Región Natural Caribe and the Cauca River drainage basin. The specimens listed above include the first reported from Falcón State, which is located in northwestern Venezuela in the Caribbean region. Parque Nacional Cueva de la Quebrada del Toro is the site of a noted underground stream.



Figs. 6-11. *Anacroneuria* female structures. (6-8 = *A. carchi*). 6. Head and pronotum. 7. Outline of egg. 8. Subgenital plate. (9-11 = *A. crusa*). 9. Head and pronotum. 10. Outline of egg. 11. Subgenital plate.

***Anacroneuria carchi* Stark**  
(Figs. 6-8)

*Anacroneuria carchi* Stark 2001:11. Holotype ♂ (Carnegie Museum of Natural History), Chical, Carchi Province, Ecuador

*Anacroneuria carchi*: Stark et al., 2012:82.

**Material examined. Ecuador:** Esmeraldas Province, Cantón San Lorenzo, Río Lita, 1830', 00° 51.64' N, 78° 27.16' W, 2 December 2008, S.M. Clark, R.C. Mower, 2♂, 1♀ (BYUC).

**Comments.** This species was recently recorded by Stark et al. (2012) from two male specimens collected

together with the additional males (listed above) and first female specimen recorded here and described below. The adult head and pronotum are also illustrated for the first time (Fig. 6). The Rio Lita collection site is located in the Northwestern Ecuadorian Pacific Zone, which forms part of the Choco Biogeographic Region, an area known for its hot, humid climate.

**Female.** Forewing length 17 mm. Subgenital plate pale, hairy and bilobed, mesal notch relatively narrow and shallow (Fig. 8). Posterior transverse sclerite on sternum 9 pale, mesal field of sternum 9 uniformly covered with moderately long pale setae.

**Egg.** Length ca. 0.32 mm, greatest width ca. 0.19 mm. Spindle shaped with button-like collar (Fig. 7).

#### *Anacroneuria cipriano* Zúñiga & Rojas

*Anacroneuria cipriano* Zúñiga & Rojas 1999, in Stark et al., 1999:25. Holotype ♂ (Museo de Entomología de la Universidad del Valle), Rio Azul, Valle del Cauca Department, Colombia

**Material examined. Colombia:** Caldas Department: 20 miles W Manizales, 16 March 1955, E.I. Schlinger, E.S. Ross, 1♂ (CAS). Tolima Department: 18 miles W Honda, 16 March 1955, E.I. Schlinger, E.S. Ross, 1♂ (CAS).

**Comments.** This species was previously known from two males collected in Valle del Cauca Department. This site on Rio Azul is located in the Pacific Region and the western Andes (Stark et al. 1999). The new records extend the species distribution to the Central Andes and the middle Magdalena River valley.

#### *Anacroneuria crusa* Stark (Figs. 9-11)

*Anacroneuria crusa* Stark 1995:231. Holotype ♂ (USNM), north of Duida, Territorio Federal Amazonas, Venezuela

*Anacroneuria crusa*: Stark, 1999:75. Records from Guyana and Venezuela

**Material examined. Colombia:** [Putumayo Department]: Santa Rosa, Rio San Miguel headwaters, Kofan Indian Village, 2-24 October 1970, B. Malkin, P. Burchard, 7♂, 2♀ (CAS). Santa Rosa de Sucumbios, Kofan Indian Village, Rio San Miguel, 400 m, 26 August-9 September, 1971, B. Malkin, 1♂ (CAS).

**Comments.** The original description of this species included male and larval specimens, but the adults were in poor condition and the habitus could not be adequately described. This larger sample of male and female specimens allows the descriptions of adult habitus, female genitalia and the egg. This species was previously reported from Guyana and Venezuela. These first records from Colombia are from the Amazon Natural Region. Rio San Miguel

joins Rio Putumayo and forms one of the major tributaries of the Amazon River basin.

**Adult habitus.** General color yellow-brown, patterned with dark brown. Head with obscure, yellow-brown spot forward of ocelli and dark brown lappets and antennae (Fig. 9). Pronotum brown over most of disc but with moderately pale anterolateral area and pale median band. Dark brown bands on apical third of hind femora; fore and mid femora with wider dark bands; tibiae brown but with darker proximal and distal brown bands. Wings dark amber, veins pale brown except Sc, R and Cord crossvein dark brown.

**Female.** Forewing length 13.5 mm. Subgenital plate with four, approximately equal sized lobes; median notch deeper than lateral notches (Fig. 11). Posterior margin of sternum 9 with narrow sclerotized band bearing several thick setae; median field of sternum 9 with patch of shorter setae lying in median notch of sternum 8, additional longer setae occur posterolateral to median patch.

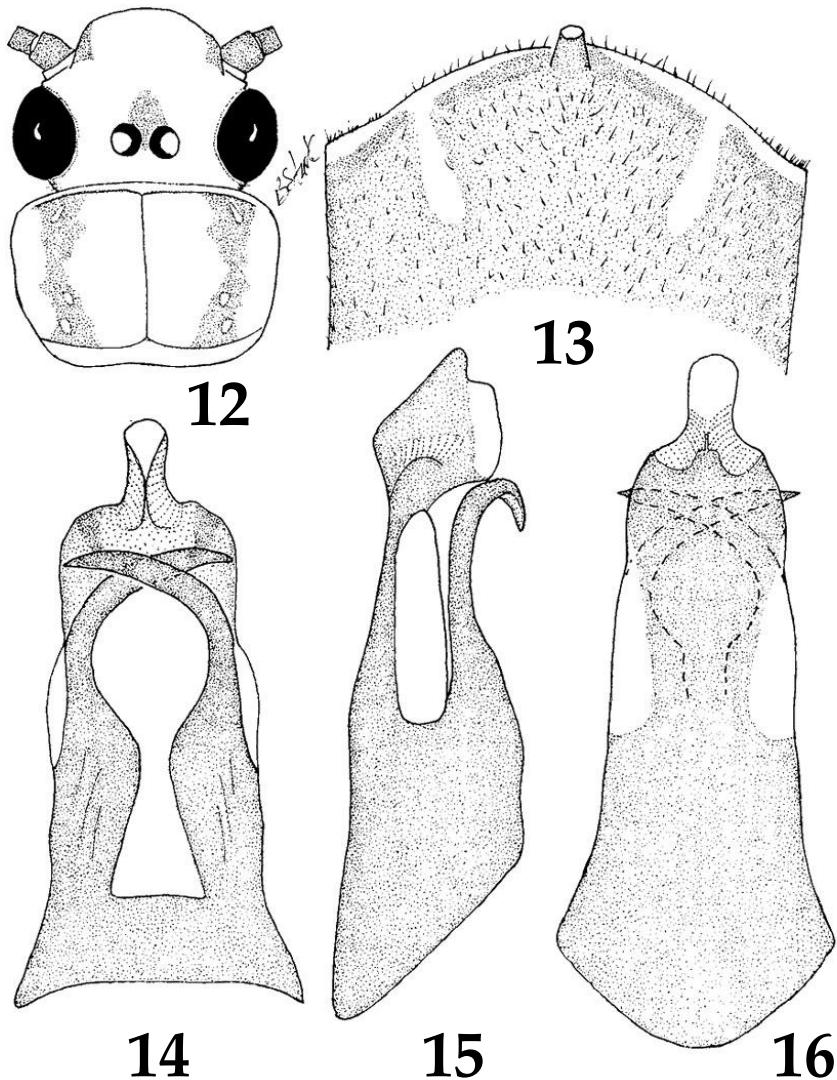
**Egg.** Length ca. 0.3 mm, greatest width ca. 0.16 mm. Outline spindle shaped with low, button-like collar (Fig. 10). Anchor bearing a small membranous knob which lies over collar.

#### *Anacroneuria inza* Zúñiga & Stark

*Anacroneuria inza* Zúñiga & Stark 2002:210. Holotype ♂ (Museo de Entomología de la Universidad del Valle), 1 km S San Andrés de Pisimalá, Cuenca Rio Paez, Quebrada San Andrés, Municipio de Inzá, Cauca Department, Colombia

**Material examined. Colombia:** Cauca Department: San Andreas [= San Andrés], Tierradentro, ~1500 m, 21-22 November 1971, B. Malkin, 1♂ (CAS).

**Comments.** The species was originally described from five male specimens collected in Cauca Department. The “San Andreas” location listed on the label for Malkin’s specimen is the same site as “San Andrés de Pisimalá” from the original description. The site is in the Central Andes of southwestern Colombia and the species is known only from this region in a narrow elevational range of 1500-1750 m a.s.l. The site is the seat of the indigenous Paez community (Zúñiga & Stark 2002).



Figs. 12-16. *Anacroneuria yuko* male. 12. Head and pronotum. 13. Sternal 9 with hammer. 14. Aedeagus, ventral. 15. Aedeagus, lateral. 16. Aedeagus, dosal.

#### *Anacroneuria mindo* Zúñiga & Vásconez

*Anacroneuria mindo* Zúñiga & Vásconez 2006, in Zúñiga et al., 2006:51. Holotype ♂ (Museo de Entomología de la Universidad del Valle), Rio Mindo, Parroquia Mindo, Pichincha Province, Ecuador

**Material examined. Colombia:** Cauca Department, San Andreas [= San Andrés], Tierradentro,

~1500 m, 21-22 November 1971, B. Malkin, 1♂ (CAS).

**Comments.** This species was previously known from the holotype specimen collected in Ecuador. The new record is the first for Colombia and it represents a significant range extension from the Pacific slope of the Ecuadorian Andes to the Cordillera Central of southwestern Colombia (also see comments on the Colombian locality under *A. inza*).

### *Anacroneuria paleta* Stark

*Anacroneuria paleta* Stark 1995:236. Holotype ♂ (USNM), 4 km S Santo Domingo, Merida State, Venezuela

*Anacroneuria paleta*: Stark et al., 1999:41.

*Anacroneuria paleta*: Maldonado et al., 2002:227.

**Material examined. Colombia:** [Cesar Department]: Socorpa Mission, Sierra de Perija, 1350 m, 20-21 August 1968, B. Malkin, 8♂ (CAS). Same location, 10-22 August 1968, B. Malkin, 16♂ (CAS). [Magdalena Department], San Sebastian de Rabago, Sierra Nevada de Santa Marta, 2000 m, 1-10 April 1968, B. Malkin, 7♂, 1♀ (CAS). **Venezuela:** Lara State, Parque Nacional Dinira, Quebrada Buenos Aires, 9°36.407'N, 70°04.178'W, 1850 m, 18-19 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 3♂ (pinned, BPSC).

**Comments.** This species is known from specimens collected in Barinas and Mérida states, Venezuela (Stark 1995; Maldonado et al. 2002) and is also recorded from Santander Department, Colombia (Stark et al. 1999) and Trujillo State, Venezuela (Stark 1999), however the Colombian specimens from Santander figured in Stark et al. (1999) appear to have a shorter apical projection of the aedeagus and the keel is shown as an obscure V-shaped structure (Figs. 136-138 in Stark et al. 1999). The Colombian specimens reported in this study have a narrow, relatively long keel and the apical aedeagal projection is more slender and slightly longer than those shown for other populations. The records given above include the first Colombian specimens from Cesar and Magdalena Departments, the first from Serranía de Perijá, and the sixth *Anacroneuria* species to be reported from the Sierra Nevada de Santa Marta (Zúñiga et al. 2013). The new records from Lara State are from a national park in the foothills of the northern mountain range of the Venezuelan Andes. Streams in this region drain into several basins, including the Orinoco River and Lake Maracaibo.

### *Anacroneuria paria* Stark

*Anacroneuria paria* Stark 1999:80. Holotype ♂ (United States National Museum), 1.5 km SE Las Piedras de Cocoliar, Rio Cocoliar, Sucre State, Venezuela

**Material examined. Venezuela:** Lara State, Parque Nacional Terepaima, Quebrada San Antonio, 9°51.754'N, 69°13.098'W, 631 m, 17 June 2001, Holzenthal, Blahnik, Paprocki, Cressa, 6♀ (pinned, BPSC).

**Comments.** This species was previously known from the type locality in Sucre State, Venezuela. These are the first specimens reported from Lara State in the southern foothills of the Sierra de Portuguesa in the Venezuelan Andes. The site is in a protected area and is part of an important biodiversity center for the Andean Cloud Forests ecoregion.

### *Anacroneuria yuko* sp. n.

(Figs. 12-16)

**Material examined.** Holotype ♂, **Colombia**, [Cesar Department], Socorpa Mission, Sierra de Perijá, ~1350 m, 10-22 August 1968, B. Malkin (CAS).

**Adult habitus.** General color pale brown. Head pale yellow-brown with slightly darker lappets and frons, forward of ocelli (Fig. 12). Antennae dark brown. Eyes with numerous fine, white setae giving a hairy appearance. Pronotum pale yellow-brown with darker sublateral bands; broad median field pale. Wing membrane pale amber with darker veins; C vein pale, Sc and R much darker. Legs pale except for narrow brown distal band superimposed on black band; tibiae with narrow proximal and distal brown bands.

**Male.** Forewing length 12 mm. Hammer thimble-shaped, height subequal to apical diameter (Fig. 13). Aedeagal apex abruptly narrowed from shoulders, forming a slender, median projecting lobe, offset from shoulders by moderately deep grooves (Fig. 14); shoulders slightly scalloped along anterior margin. Dorsal keel short in median field, but with small basolateral struts which connect to longer, dark, arcuate supports (Fig. 16). Apical area in lateral aspect with a basodorsal ear-shaped lobe and a slightly more anterior slender crescent lobe; most of apical region membranous (Fig. 15). Hooks moderately wide, saber-like.

**Female.** Unknown.

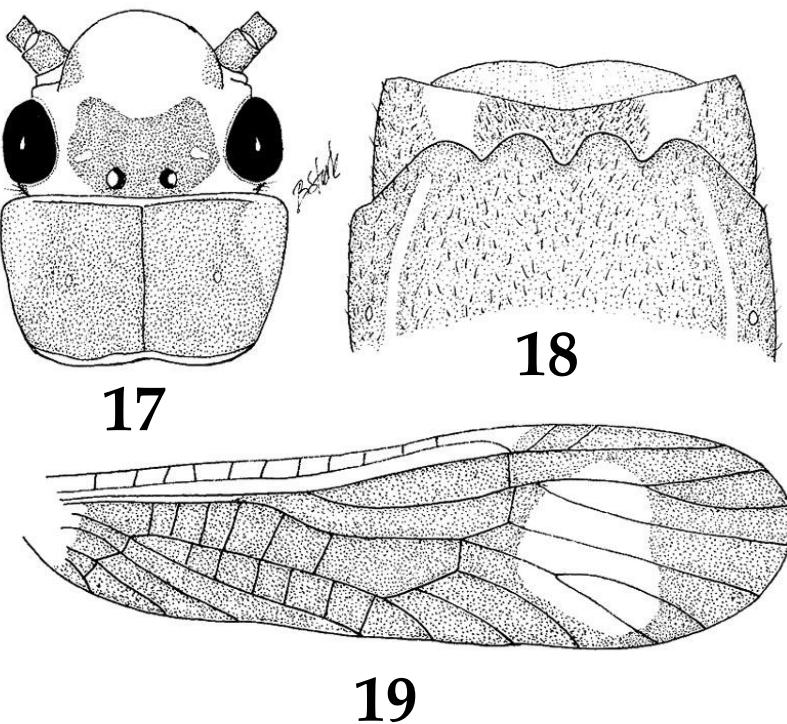
**Larva.** Unknown.

**Etymology.** The species name honors the Yuko people who inhabit the region near the type locality.

The name is used as a noun in apposition.

**Diagnosis.** The aedeagal structure of *A. yuko* is similar to that of *A. arcabuca* Zúñiga & Stark 2006 (in Zúñiga et al. 2006,) and to *A. tejon* Baena & Stark 1999 (in Stark et al. 1999), but it differs from both in the lateral profile of the apical aedeagal region. In the new species this structure projects more strongly away from the aedeagal body (Fig. 15), whereas, in the two known species, this process is more dorsally oriented. The new species is more similar to the former species but is smaller (17.5 mm forewing in *A. tejon*), has a more defined keel and less pronounced scalloping along the anterior margins.

**Comments.** This new species is the second *Anacroneuria* to be reported from the Serranía de Perijá range which forms part of the border between northwestern Colombia and adjacent areas of Venezuela (see comments under *A. paleta* above). The collection site for the holotype lies on the northwestern slope of the mountain range and is in the drainage basin of Rio Cesar which enters the Magdalena River and the Colombian Caribbean. This mountain range is considered part of the biogeographic unit known as the Cinturón árido Pericaribeño.



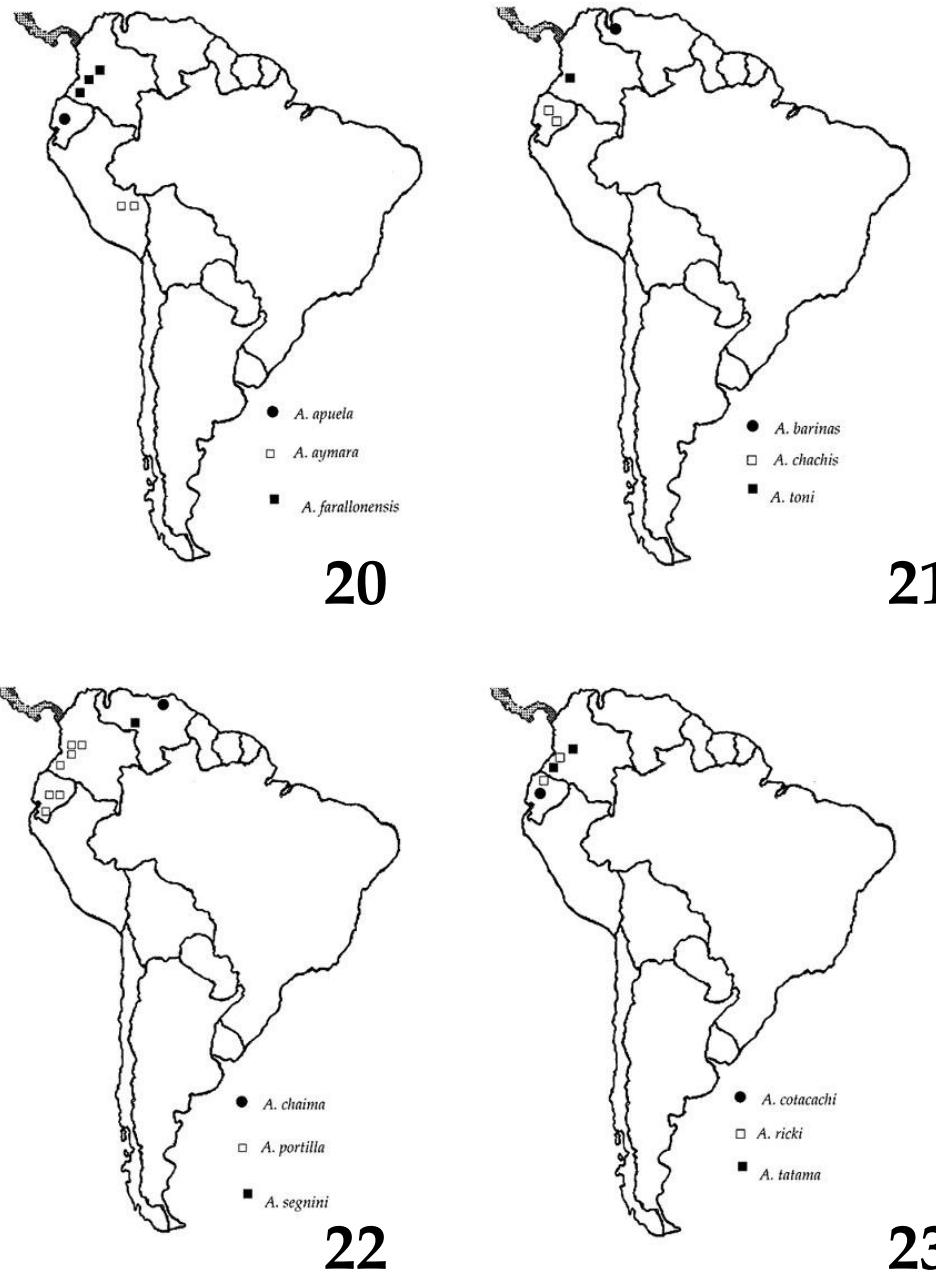
Figs. 17-18. *Anacroneuria* VZ-13 female. 17. Head and pronotum. 18. Subgenital plate. 19. Forewing.

#### *Anacroneuria* VZ-13 (Figs. 17-19)

**Material examined. Venezuela:** Lara State, Parque Nacional Terepaima, Rio Aura near Sabana Alta, 9°44.740'N, 69°16.614'W, 480 m, 16 June 2001,

Holzenthal, Blahnik, Paprocki, Cressa, 1♀ (pinned, BPSC).

**Adult habitus.** General color dark on head and pronotum and yellow-brown over meso and metathorax and abdomen. Head dark over central frons and yellow brown on anterior half of frons;



Figs. 20-23. Distribution of *Anacroneuria aymara* group species.

antennae black (Fig. 17). Pronotal disc dark except for pale anterolateral area. Wings with dark pigment over most of membrane, but with a pale circular window spot beyond cord which extends from above

Rs vein to at least the first median vein (Fig. 19); coastal area pale from base to end of Sc vein. Legs mostly black, but hind femora banded, dark apically and pale in basal half.

Stark, B.P. & M. del C. Zúñiga 2014. New species and records of Colombian, Ecuadorian and Venezuelan *Anacroneuria* (Plecoptera: Perlidae), with a review of the *Anacroneuria aymara* Stark & Sivec Complex. *Illiesia*, 10(08):66-79. Available online: <http://www2.pms-lj.si/illiesia/Illiesia10-08.pdf>

**Male.** Unknown.

**Female.** Forewing length 10 mm. Subgenital plate with four lobes, similar in length but outer lobes wider than inner pair (Fig. 18). Median sclerite of sternum 9 rather uniformly covered with setae; outer zones of patch with slightly longer and thicker setae. Intersegmental membrane between sterna 9 and 10 densely armed with microtrichia.

**Egg.** Unknown.

**Larva.** Unknown.

**Comments.** This species is another small, dark, distinctively pigmented and unassociated female *Anacroneuria*. Although several similar females have been described in previous studies (e.g. *A. wapishana* Stark, 1999), this specimen appears distinct from these. The informal designation "VZ-13" indicates this is the thirteenth *Anacroneuria* species from Venezuela to be provisionally recognized from unassociated females or larvae (Stark 1995; Maldonado et al. 2003). The collection site is within a national park in the mountainous region of Lara and Portuguesa states. Vegetation in the highlands is cloud forest and streams in this area enter the Orinoco River basin.

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